

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
25 August 2005 (25.08.2005)

PCT

(10) International Publication Number
WO 2005/078327 A1

(51) International Patent Classification⁷: **F16L 11/04**,
B32B 1/08, 27/34

(21) International Application Number:
PCT/US2005/003942

(22) International Filing Date: 4 February 2005 (04.02.2005)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
60/542,729 6 February 2004 (06.02.2004) US

(71) Applicant (for all designated States except US):
COOPER-STANDARD AUTOMOTIVE INC. [US/US];
39550 Orchard Hill Place, Novi, MI 48375 (US).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **LOVETT, Brad, A.**
[US/US]; 5396 Sunnycrest Drive, West Bloomfield, MI
48323 (US). **ROSENBERG, Andrew, M.** [US/US]; 7627
Dryden Road, Almont, MI 48003 (US).

(74) Agent: **KOZIARZ, Matthew, L.**; Carlson, Gaskey &
Olds, P.C., 400 West Maple Road, Suite 350, Birmingham,
MI 48009 (US).

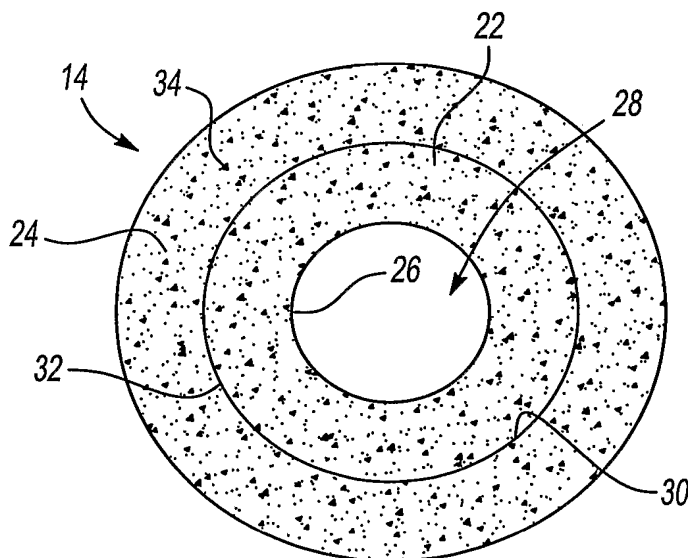
(81) Designated States (unless otherwise indicated, for every
kind of national protection available): AE, AG, AL, AM,
AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN,
CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI,
GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE,
KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD,
MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG,
PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM,
TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM,
ZW.

(84) Designated States (unless otherwise indicated, for every
kind of regional protection available): ARIPO (BW, GH,
GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM,
ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM),
European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI,
FR, GB, GR, HU, IE, IS, IT, LT, LU, MC, NL, PL, PT, RO,
SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN,
GQ, GW, ML, MR, NE, SN, TD, TG).

Published:
— with international search report

[Continued on next page]

(54) Title: AROMATIC POLYAMIDE TUBING FOR VEHICLE APPLICATIONS



(57) Abstract: A vehicle tube (14) includes a layer of aromatic polyamide (22). In one example, an outer layer of aromatic polyamide (24) is bonded to the layer aromatic polyamide (22). In another example, the layer of aromatic polyamide (22) includes filler and modifying agents (34) and is electrically conductive. Example filler and modifying agents (34) include carbon powder, carbon nanotubes, metal fiber, heat-stabilizing agent, impact-modifying agent or mixtures thereof. In another example, the outer layer of aromatic polyamide (24) includes a corrugated outer surface portion (70) to provide flexibility to the tube (14). One example method includes extruding an aromatic polyamide barrier layer (22), extruding a second aromatic polyamide barrier layer (24) coaxially with the first aromatic polyamide layer (22), and

bonding the second aromatic polyamide barrier layer (24) to the first aromatic polyamide barrier layer (22).

WO 2005/078327 A1



For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.